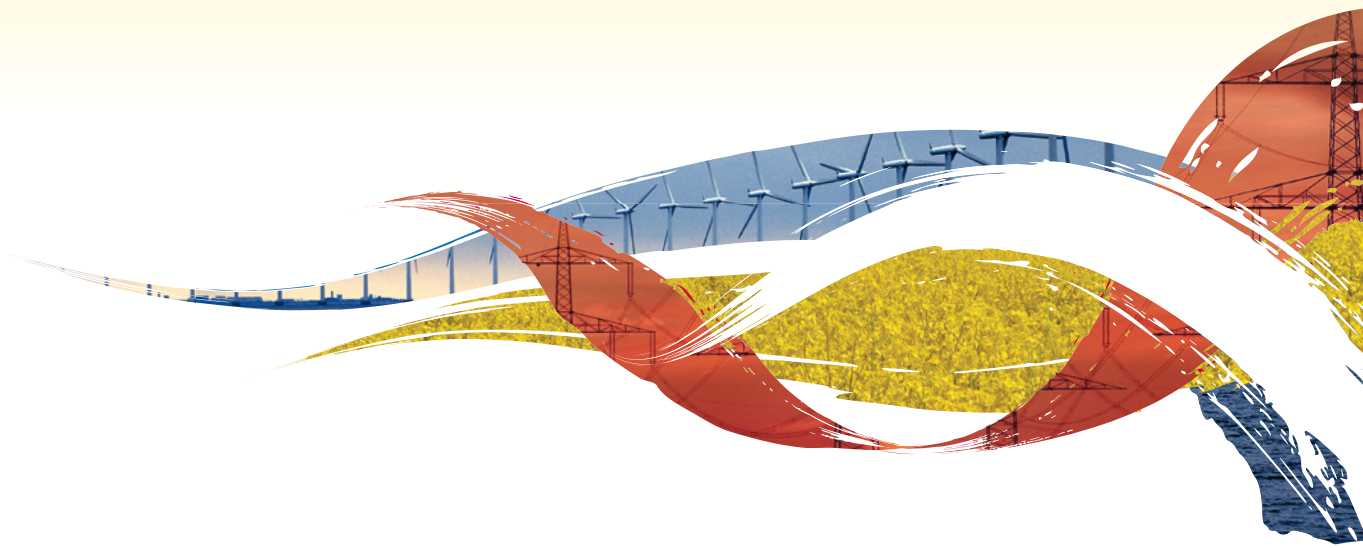
Nordic Council of Ministers

Nordic-Chinese Energy Technology Cooperation

Opportunities for a joint Nordic approach to cooperation with China in the development of low-carbon energy technologies



China – A central player in energy and climate issues

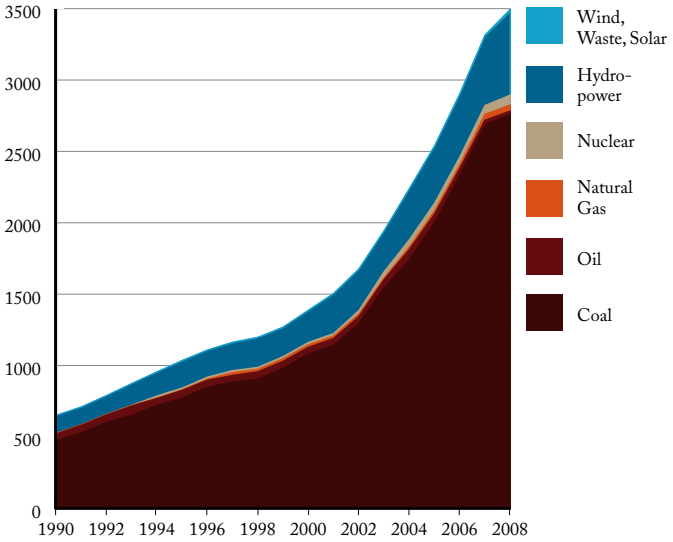
China plays a key role in global energy and climate negotiations, and is increasingly influential in the global market for low-carbon energy technologies.

China's demand for energy has increased dramatically in recent decades, and due to coal's significance in its energy mix, so have CO_2 emissions. In an effort to decouple economic growth from increases in emissions, China aims to reduce its CO_2 per unit of GDP by 40 to 45% in 2020 compared to 2005. This will require a variety of technologies and measures, many of which are well underway.

In wind power for example – a showcase technology for the Nordic region – China is installing capacity at a staggering rate. It became the world's largest market for wind turbines in 2009, and is already the world's largest producer of both wind turbines and photovoltaic solar modules.

China: Electricity Generation by Source (TWh)

China's demand for electricity has risen substantially in the last decade



Source: IEA

And an emerging R&D powerhouse

China's focus is expanding beyond the manufacture and implementation of these technologies, to their research and development too. The country's total R&D expenditure has increased at twice the pace of its already-rapid GDP growth in the past decade. This is reflected in R&D for low-carbon energy technologies, as well as publications, patents and other measures of innovative activity.

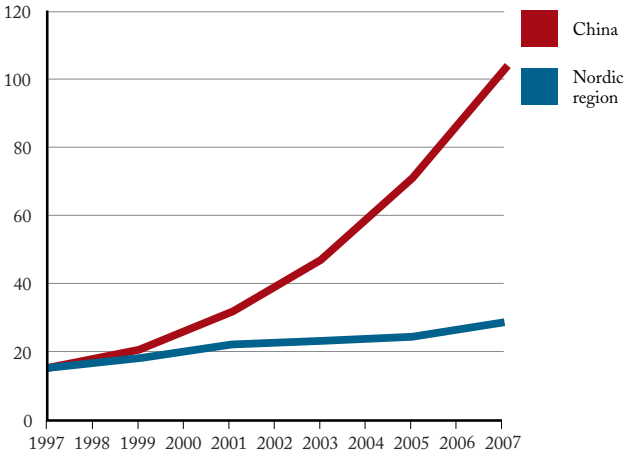
Instead of attempting to compete with Chinese R&D, foreign companies and governments have rushed to cooperate. A large number of key energy technology companies from the Nordic region operate R&D centres in China, and bilateral R&D agreements between Nordic countries and China have paved the way for cooperation at the university level.

"In the process of making China's energy systems more sustainable, the Nordic region's vast experience would be of great assistance"

Johan Tiedemann, State Secretary to the Swedish Minister for Nordic Cooperation, June 2010

R&D expenditure (billion USD, PPP)

China has greatly increased its focus on research and development in recent years



Source: Nordic Globalisation Barometer 2010

Norden – A clean energy specialist

The Nordic region is both a leading user of renewable energy, and a pioneer in a number of low-carbon energy technologies.

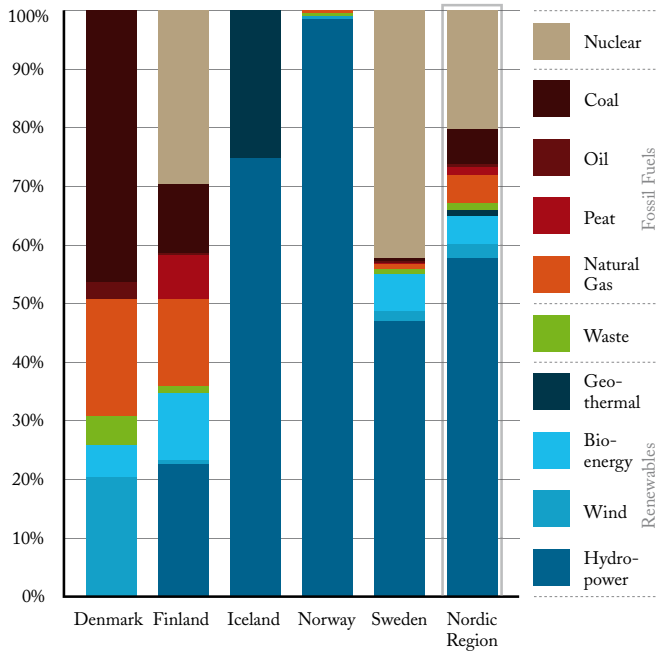
Denmark is well known as a technology leader in wind energy, Finland has considerable expertise in biomass for combined heat and power, Sweden is at the forefront of second generation biofuels, Iceland has geothermal expertise and Norway is pioneering in carbon capture and storage.

Alone the Nordic countries are small, but together they constitute the 10th largest economy in the world. Cooperation within the region has a long history, and has facilitated the incorporation of renewable energy into the system: Fluctuating wind in the South is balanced by hydropower in the North, through one of the most integrated international electricity grids in the world.

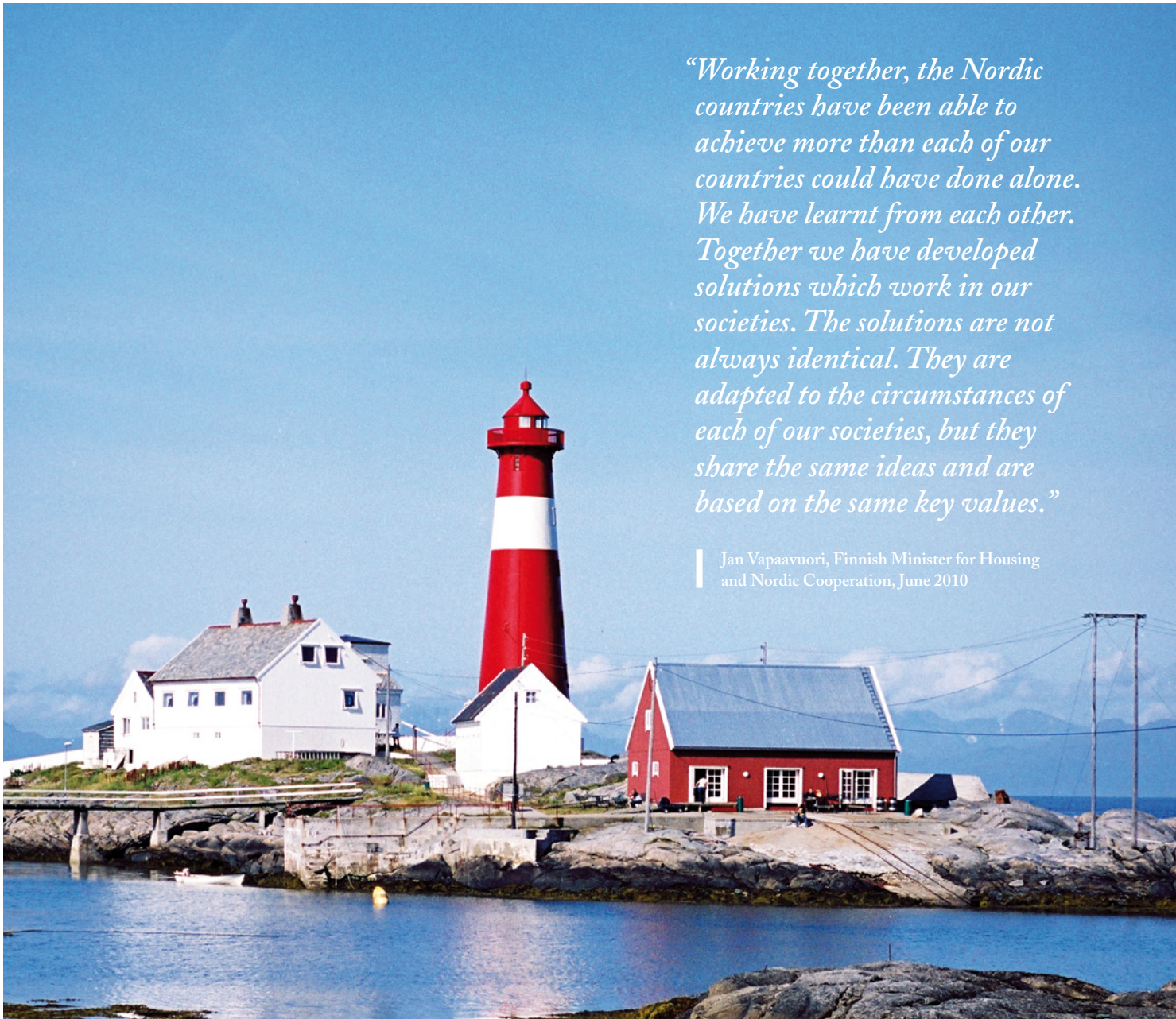
The Nordic region specialises in solutions combining multiple technical and regulatory systems. China can benefit from the Nordic region's expertise and experience in fields ranging from smartgrids and cross-border electricity market integration, to offshore wind systems.

Nordic Region: Electricity Generation by Source

The Nordic region generates 66% of its electricity from renewable sources



Source: Nordel 2008



"Working together, the Nordic countries have been able to achieve more than each of our countries could have done alone. We have learnt from each other. Together we have developed solutions which work in our societies. The solutions are not always identical. They are adapted to the circumstances of each of our societies, but they share the same ideas and are based on the same key values."

Jan Vapaavuori, Finnish Minister for Housing and Nordic Cooperation, June 2010

A strong foundation to build upon

The Nordic countries already have strong R&D connections with China. Most Nordic governments have initiated formal cooperative agreements with key Chinese governmental bodies, such as the Ministry of Science and Technology or the National Development and Reform Commission.

In addition to these national-level agreements, a great number of linkages exist in the academic and industrial sectors. Swedish universities for example, have more than 120 cooperative agreements with Chinese universities. This cooperation is evidenced by significant growth in Nordic co-publications with China, which – according to the Nordic Globalisation Barometer – are increasing faster than co-publications between China and the rest of Europe.

Energy technologies are a common element in national and university-level agreements alike, due to the significant potential the sector has for Nordic-Chinese cooperation.

An analysis of opportunities

An analysis of the opportunities for a Nordic approach to energy technology cooperation with China has been commissioned by Nordic Energy Research – an agency of the Nordic Council of Ministers. This analysis, entitled "Nordic Collaboration with China in Energy Research and Development", was conducted by Jørgen Delman and Yong Chen of the Nordic Institute for Asian Studies. It identified a range of opportunities and assessed that the time was right for a joint Nordic approach. It also provided concrete recommendations for further action, including four potential organisations of the cooperation:

The report can be downloaded by following the links on the back page.

1. **An Expert Committee**
   A Nordic-Chinese committee facilitating information exchange to enhance mutual understanding of R&D capacities and priorities.

2. **A Nordic-Chinese Small Projects Facility**
   A medium-scale programme creating common platforms for cooperative R&D in selected technologies.

3. **A joint Nordic-Chinese R&D Programme**
   A larger-scale programme institutionalising Nordic-Chinese energy collaboration and working towards common strategic goals.

4. **A broader Nordic-Chinese Energy and Climate Change Programme**
   A full-scale programme including the above activities, as well as the organisation of frequent projects and events to reinforce the Nordic-Chinese partnership.

"We mutually need cooperation that supports economic growth while at the same time reduces CO_2 emissions. I think that China and the Nordic region have a lot to offer each other in this respect.

It is clear that the opportunities for cooperation between governments, research institutions and private companies in China and the Nordic countries are good. And I am sure that the cooperation can benefit us all and be a concrete response to the common challenge of climate change"

Karen Elleman, Danish Minister for the Environment and for Nordic Cooperation, speaking at the Nordic-Chinese Energy & Climate Day, June 2010

The Nordic-Chinese Energy & Climate Day

The Nordic-Chinese Energy and Climate Day was held in June 2010 at the World Expo in Shanghai. The event took place in all five of the Nordic pavilions, where Ministers, researchers and business leaders from the Nordic region and China exchanged ideas about future cooperation. The event was covered by several major TV channels, radio stations and newspapers.

During the day, a panel discussion chaired by Jørgen Delman provided further ideas as to how cooperation can move forward. It was suggested that the Nordic region concentrate its resources on a single city or region within China, especially considering the number of Chinese eco-cities planned for development over the coming decades.

The day was initiated through a joint decision from the Nordic Prime Ministers, and was managed by Nordic Energy Research.

Additional information and presentations from the day can be downloaded by following the links on the back page.

Nordic-Chinese
Energy & Climate Day
北欧–中国能源与气候论坛

From left: Johan Tiedemann, State Secretary to the Swedish Minister for Nordic Cooperation; Karen Ellemann, Danish Minster for the Environment and for Nordic Cooperation, Chair of the five Ministers of Nordic Cooperation; Jan Vapaavuori, Finnish Minster of Housing and Nordic Cooperation; and Palle Christiansen, Greenland Minister of Finance and for Nordic Cooperation.

Danish Pavilion

Copenhagen's Little Mermaid, at the Danish pavilion in Shanghai.

Finnish Pavilion

Swedish Pavilion

Jan Vapaavuori, Finnish Minster of Housing and Nordic Cooperation held a welcoming note at the Finnish Pavilion.

Why a *Nordic* Approach?

- The Nordic region offers a complete package of low-carbon energy technology competencies.
- Together, the Nordic countries have the resources to make their voices heard in China.
- There is recognition of the Nordic brand in China.
- Existing bilateral cooperation provides an ideal base for a Nordic approach.

Norwegian Pavilion

Icelandic Pavilion

Professor Jiang Kejun, Senior researcher at the Energy Research Institute of China's National Development and Reform Commission and a noted expert who has served as a lead author in the UN's Intergovernmental Panel on Climate Change (IPCC), was interviewed by the Chinese media.

Anne Cathrine Gjærde, Director of Nordic Energy Research, held a presentation in the Swedish Pavilion.

Bo Diczfalusy, Head of the Directorate of Sustainable Energy Policy and Technology, International Energy Agency, underlined the importance of international collaboration on energy technologies and innovation.

Gu Jin, Deputy Director General, Department of International Cooperation, Chinese National Energy Administration, offered insights from the Chinese government on further cooperation.

"Bearing in mind that a considerable number of scattered R&D activities in the renewable energy field are already being undertaken between the Nordic countries and China, the main role that Nordic collaboration could play would be to create synergy, to add value to, as well as to explore new areas and venues that would encourage innovative R&D initiatives."

Jørgen Delman and Yong Chen, "Nordic Collaboration with China in Energy Research and Development"

Jørgen Delman, Professor at Copenhagen University.

More information

Delman, J. & Chen Y. 2008 "Nordic Collaboration with China in Energy Research and Development" available at www.nordicenergy.net/publications.cfm

The Nordic-Chinese Energy & Climate Day, more information and presentations available at www.nordicenergy.net/china

Photos: Patrick Wack, Nordic pavilions, Nordic Council of Ministers

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